



Planning for Innovative Reuse of Dredged Material

Presented to:
National Dredging Team

By
The Maryland Port Administration

April 21, 2009



Introduction

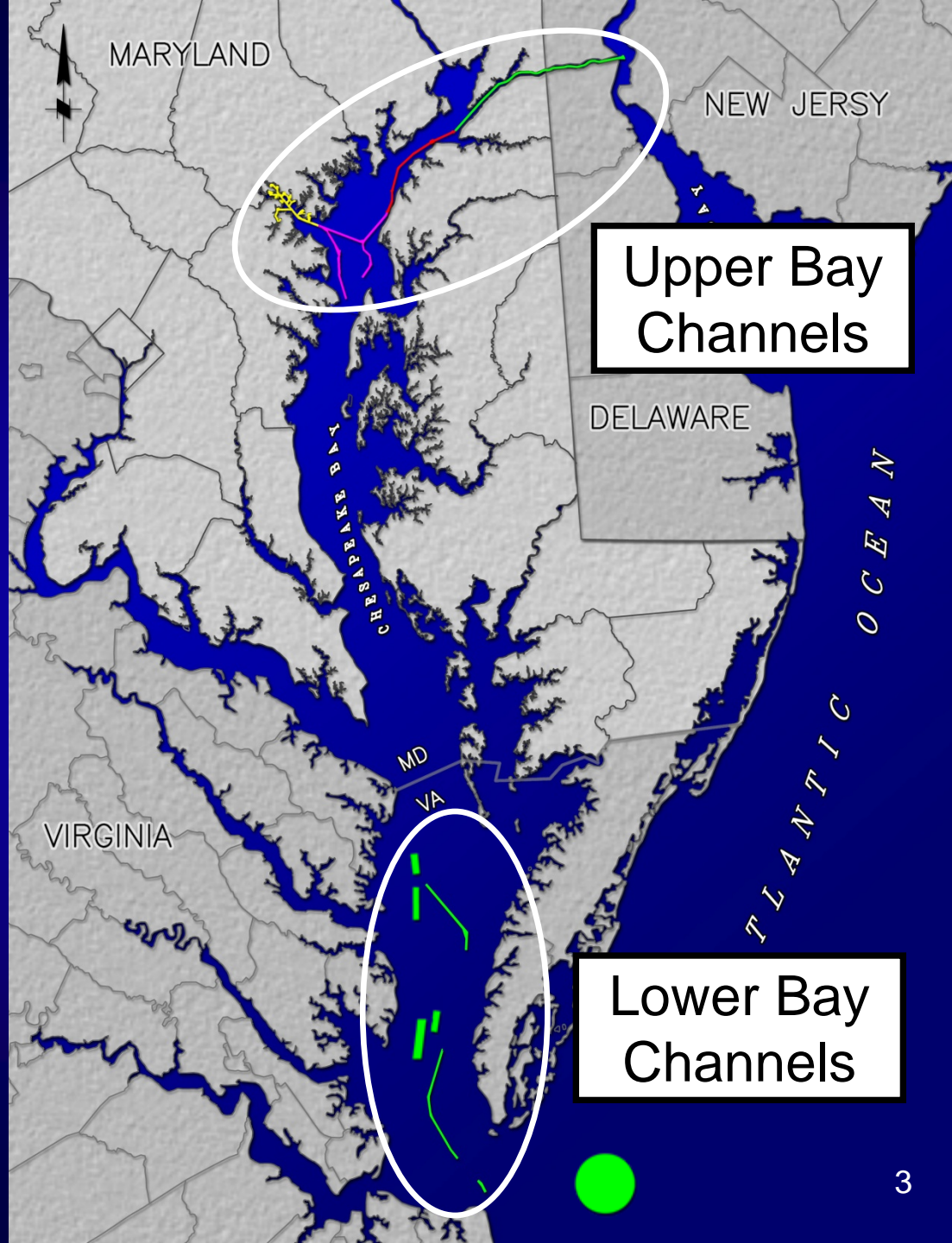
- Maintenance and improvement of Baltimore's Channel System requires ~5 mcy of dredging annually
- Over time, many traditional placement methods were being eliminated by legislation, or made increasingly difficult (cost/time) by regulation - new options needed
- Maryland began looking for new and innovative options in the mid 1980's, but new options were frequently more costly, and rejected as fiscally unsound
- Maryland's legislature provided a nexus on these issues with the Dredged Material Management Act of 2001
- Maryland Port Administration then developed a new approach to management of dredged material



Port of Baltimore's Channel System

Channel Legend:

-  20 Year Placement Capacity Exists
-  20 Year Placement Capacity Being Developed





Channel System Dredging Needs

- **Channel Reaches**

Annual Maintenance Volumes

- C&D Canal 0.4 Mcy

- **C&D Canal Approach** 1.2 Mcy

- **MD Bay Channels** 2.0 Mcy

- **Harbor Channels** 1.5* Mcy

- **VA Bay Channels** + 0.5 Mcy

- Subtotals

 4.7 Mcy 0.9 Mcy

- **Grand Total** 5.6 Mcy

* Includes Projected New Work

Yellow indicates volumes for which Maryland is currently providing placement capacity.



Upper Bay Maintenance

Where It Goes Now

- Harbor Sites (1.5 Mcy/yr)
 - Hart-Miller Island – annual capacity 2.7+ Mcy/yr, closes by legislative edict 12/31/09
 - Cox Creek – annual capacity 0.5 Mcy/yr, remaining capacity 6 Mcy
- Bay Sites (3.2 Mcy/yr)
 - Poplar Island – annual capacity (2011) 1.7 Mcy/yr remaining capacity 24 Mcy
 - Pooles Island – annual capacity 2.0+ Mcy/yr, closes by legislative edict 12/31/09



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Dredged Material Management Act of 2001

Prioritizes and Defines Innovative Reuse

- Maryland's Dredged Material Management Act (DMMA) of 2001* established a hierarchy for future placement/reuse of dredged material, as follows:
 - Beneficial Uses and Innovative Reuse (IR)
 - Upland sites and other environmentally sound confined capacity
 - Expansion of existing Dredged Material Disposal Capacity other than HMI
 - Other options other than unconfined (open water) placement
- * Defines Innovative Reuse as “including the use of dredged material in the development or manufacturing of commercial, industrial, horticultural, agricultural or other products”.



Maryland DMMP Structure

Governor of Maryland

Executive Committee

Management Committee

Citizens' Advisory
Committee

Harbor Team

Masonville Citizens
Advisory Committee

Hart-Miller Island
Citizens Oversight Committee

Cox Creek
Citizens Oversight Committee

**Innovative Reuse
Committee**

Bay Enhancement Working Group (BEWG)
And Scientific and Technical Advisors



Harbor Options Selection Process

- Maryland changed its approach after the Dredged Material Management Act of 2001
- **How we did it then**
 - MPA generates placement options/ideas
 - Formal public comment on selected options
- **How we do it now – Partnership, the Harbor Team**
 - Stakeholder participation begins with project selection, they provide direction, options/ideas, community enhancements
 - Facilitators conduct meetings, MPA provides professional support
 - Stakeholder involvement continues throughout option development, construction and operation
- **Harbor Team (Created 2003)** - Members represent local communities, community activists, local jurisdictions, maritime industry, NGOs, other stakeholders and stakeholder organizations



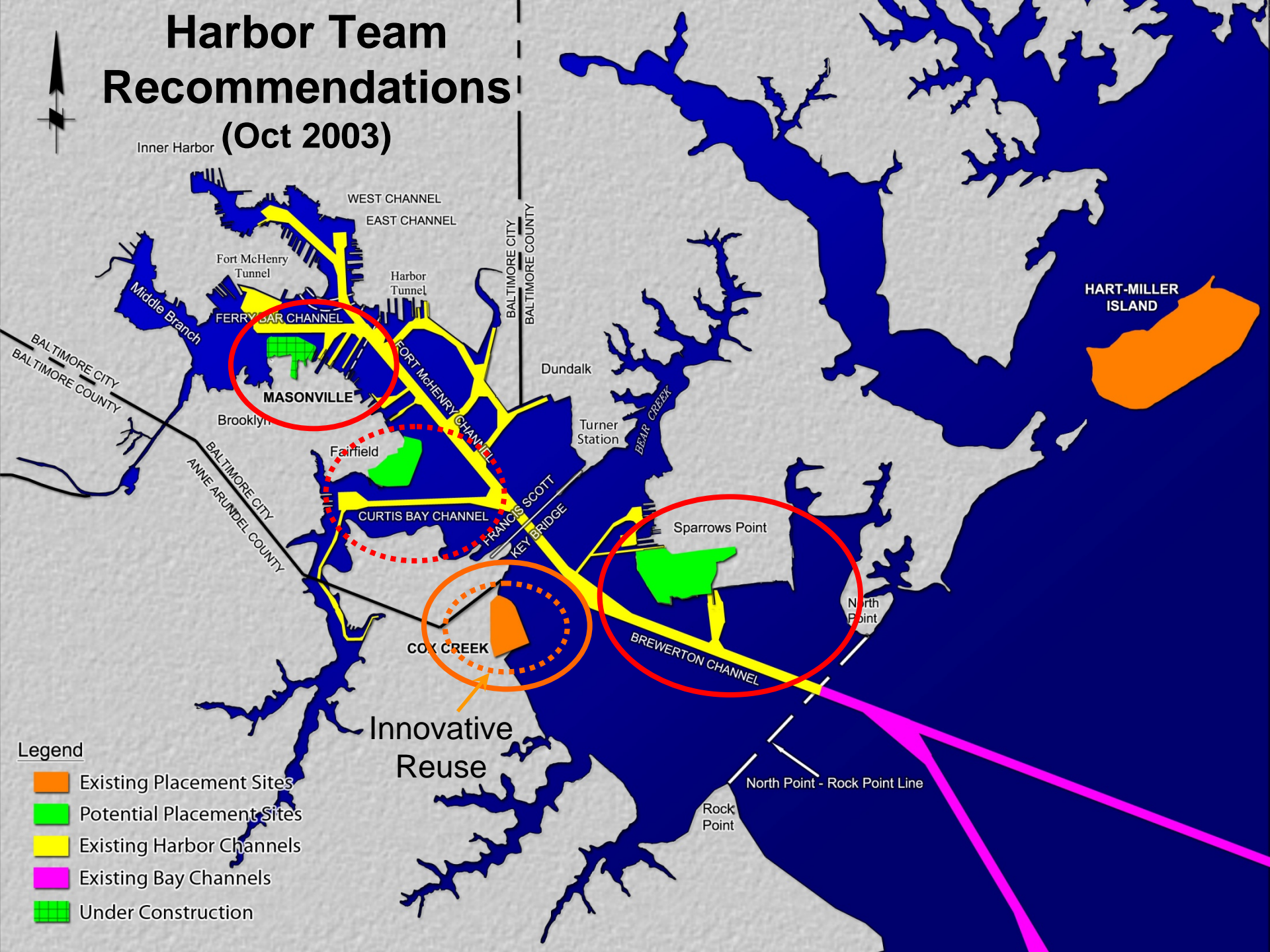
Harbor Options

Harbor Team Recommendations for Harbor Material

- Renovation and Operation of Cox Creek (*Done)
- Further Studies:
 - Masonville: subsequently recommended as 1st option (*under construction)
 - Sparrows Point, BP Fairfield (*Feasibility Study)
- Community Enhancements Included (*All Sites)
- Legislative Modification for Sparrows Point (*2010)
- **Innovative Reuse of Dredged Material**
(*Goal of 0.5 Mcy/yr by 2023)

(*Notes)

Harbor Team Recommendations (Oct 2003)



FERRY BAR CHANNEL

Existing Waterline

Reef

Fringe Marsh

Masonville DMCF

Mercedes-Benz
Phase 2

KIM

ATC

Masonville
Cove

Substrate

Wetland

Bird
Sanctuary

Non-Tidal
Wetland

Environmental
Education Center

Legend

- Demo Pier 1 & 3
- Storm Drain PH 1
- Derelict Vessel
- Pre-Dredging
- Cofferdam/Waterline
- Dike
- Storm Drain PH 2



Options Considered by IR Committee

Category

Example

- Landfilling —————→ Daily cover
- Landscaping —————→ Topsoil
- Agricultural —————→ Amendment to farms
- Reclamation —————→ Mines/Brownfields
- Engineered fill —————→ Base Material for
Parking Lots, Roads
- Building materials —————→ Bricks, Blocks, LWA,
Cement, Flowable Fill

Belgium

- Beach Nourishment
- Construction Fill
- Bricks
- Lightweight Aggregate

France

- Soccer Fields
- Port Construction

Netherlands

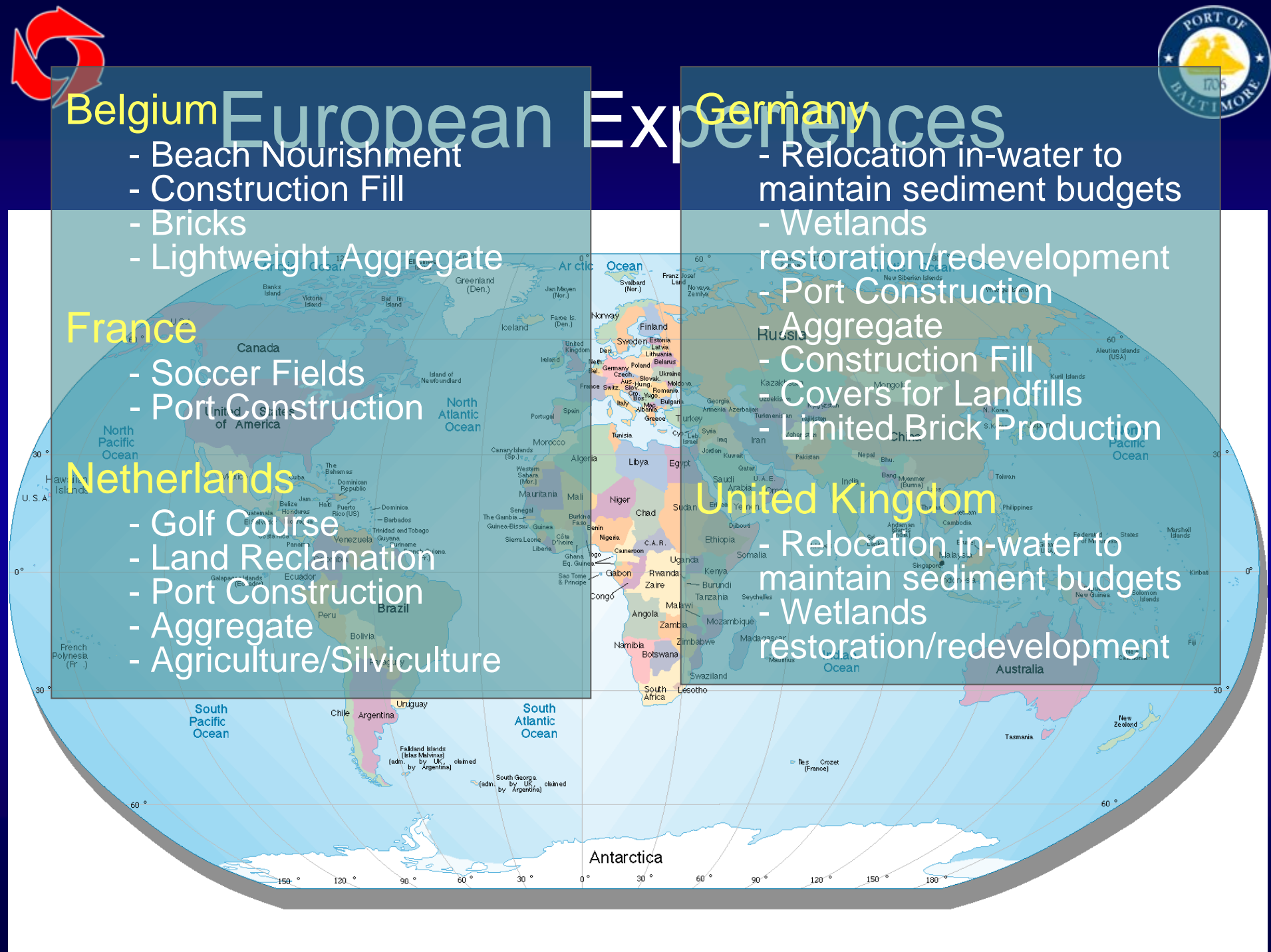
- Golf Course
- Land Reclamation
- Port Construction
- Aggregate
- Agriculture/Silviculture

Germany

- Relocation in-water to maintain sediment budgets
- Wetlands restoration/redevelopment
- Port Construction
- Aggregate
- Construction Fill
- Covers for Landfills
- Limited Brick Production

United Kingdom

- Relocation in-water to maintain sediment budgets
- Wetlands restoration/redevelopment





Middle Eastern Experiences

Qatar

- New Doha Airport (sand)

UAE

- Palm Islands (sand)

The World (sand)





Far Eastern / Australian Experiences





Current Status of MPA's IR Program

- The Innovative Reuse Committee continues to provide advice and direction.
- An RFP was advertised in August 2007, invites participation by all parties and processes. The RFP remains open, terminates at MPA's discretion.
- First demonstration contract approved December 17, 2008 for Schnabel Engineering from Baltimore to manufacture general or bulk embankment and structural fills using dredged material and slag fines. Currently underway at Cox Creek.



Current Status of MPA's IR Program

- Second demonstration contract to be forwarded soon for Commission approval, involves manufacture of Light Weight Aggregate for commercial use.
- A continuing dialogue with SHA on use of dredged material in highway construction and recycling initiative.
- Additional procurements at various stages in the process, proposals are awaiting official MBE approval from MDOT and in the process of developing contracts.



IR Costs - A Significant Challenge

- Typical dredged material has high water to solids ratio
- Water must be removed before/during processing to allow reuse – adds to cost
- Majority of material dredged for POB access is maintenance, which is fine-grained, unsuitable for reuse without modification – adds to cost



Addition and Removal of Water Through Dredging and Processing for Innovative Reuse

Volume (Million Cubic Yards)

Solids Water

500,000 cy
Goal

Channel

Unloading

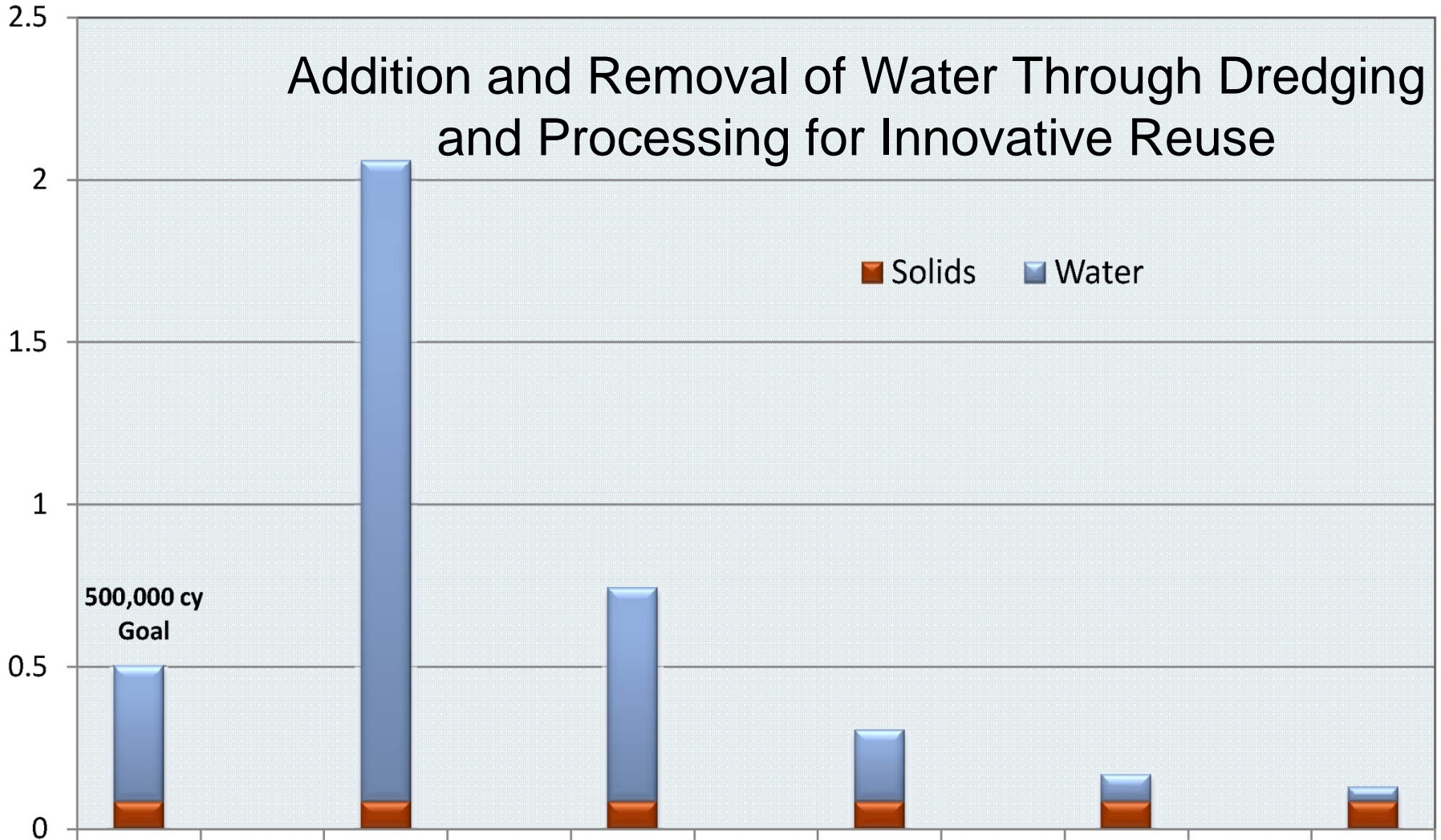
Post-Decant

Steady-State

Stockpile I

Stockpile II

Processing Stages to De-water Material for Innovative Reuse





IR Implementation Regulatory Challenges

- Dredged material is regulated as a waste
- Innovative Reuse uses a variety of processes to modify this “waste” to develop a reusable/marketable product
- MD regulators are coordinating with and observing our program to determine how to best regulate innovative reuse processes for dredged material



Placement Option Cost Comparison

Option	Total Cost (\$/cy)	State Costs (\$/cy)
Bay Islands (new)	\$10 - \$15	\$3 - \$5
Harbor CDFs* (renovated/new)	\$20 - \$23*	\$13 - \$15*
Innovative Reuse** (new)	\$35 - \$100	\$35 - \$100
Ocean Placement*** (new)	\$25 - \$45	\$18 - \$38
Hart-Miller Island (existing)	\$10	\$2
Open Water Placement (Pooles Island, Deep Trough) (existing)	\$9	\$3

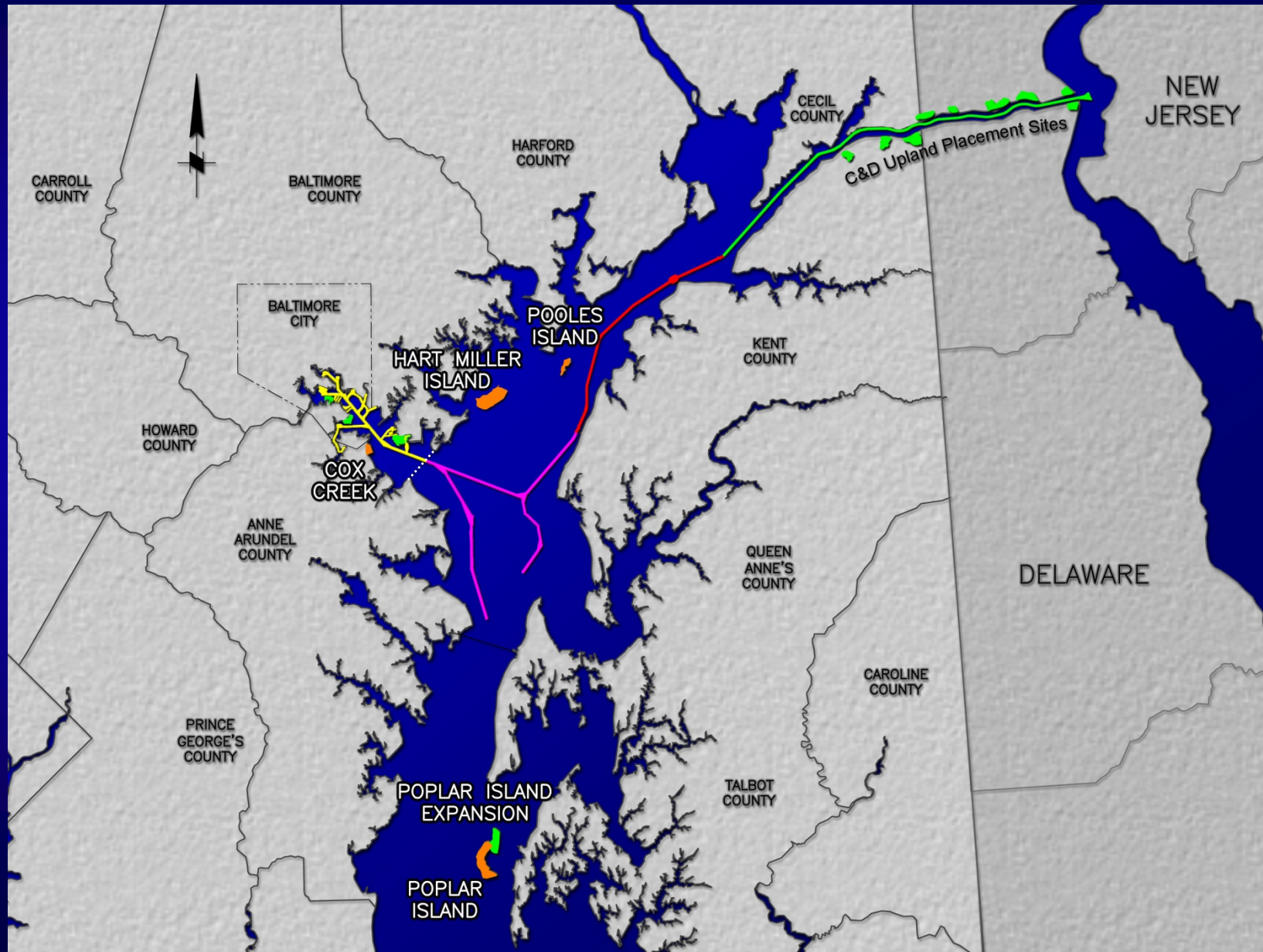
* Total initial costs borne by the state, federal share to be recovered through tipping fee arrangement.

** Corps participation undefined at this point.

*** Difficult to put together cost efficient equipment package due to numbers of ocean certified barges required.

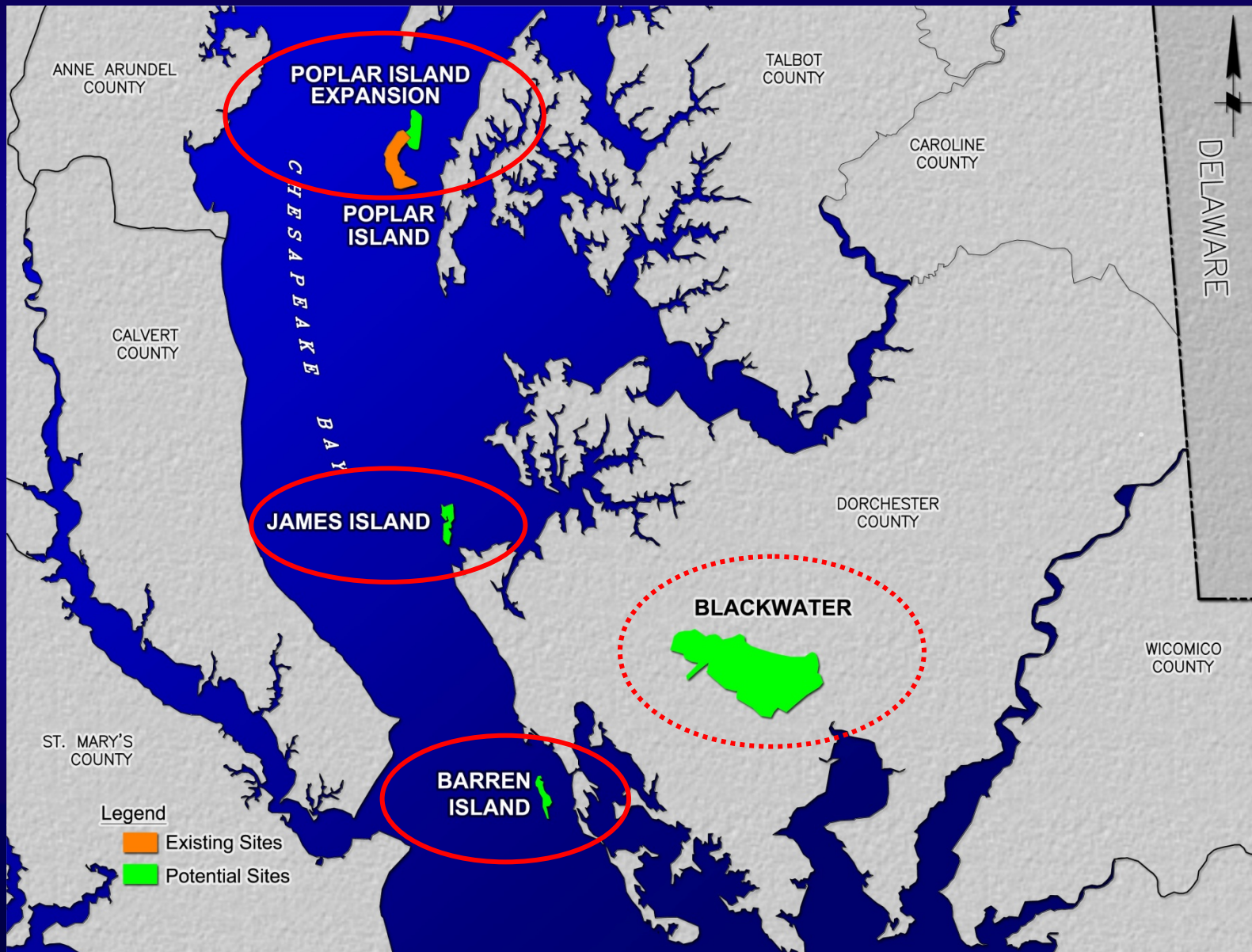


Upper Bay Channel System





Future and Potential Bay Placement Sites





Summary

- The Maryland Port Administration is committed to innovative reuse of dredged material
- Innovative Reuse options are generally much more expensive than other existing options
- Costs of IR options should not be limited to ports but shared by other vested interests
- Extensive use of IR processes for dredged material will depend upon a combination of cost, applications in civil works, marketability and effective, coordinated regulation





Bay Sites, Existing, Authorized, & Under Study (3.2 Mcy/yr Need)

Calendar Years

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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POOLES ISLAND (1.2 Mcy/yr)

POPLAR

ISLAND EXISTING (2.0 Mcy/yr)

Overloading

POPLAR ISLAND EXPANSION (2.0 - 3.5 Mcy/yr)

Construction

Thru 2027

MID-BAY ISLAND (3.5 – 7.0 Mcy/yr)*

Construction

Thru 2050

A 20-yr Plan is implemented in 2018.

*** Modified from Mid-Bay Island Report, Aug 2006**



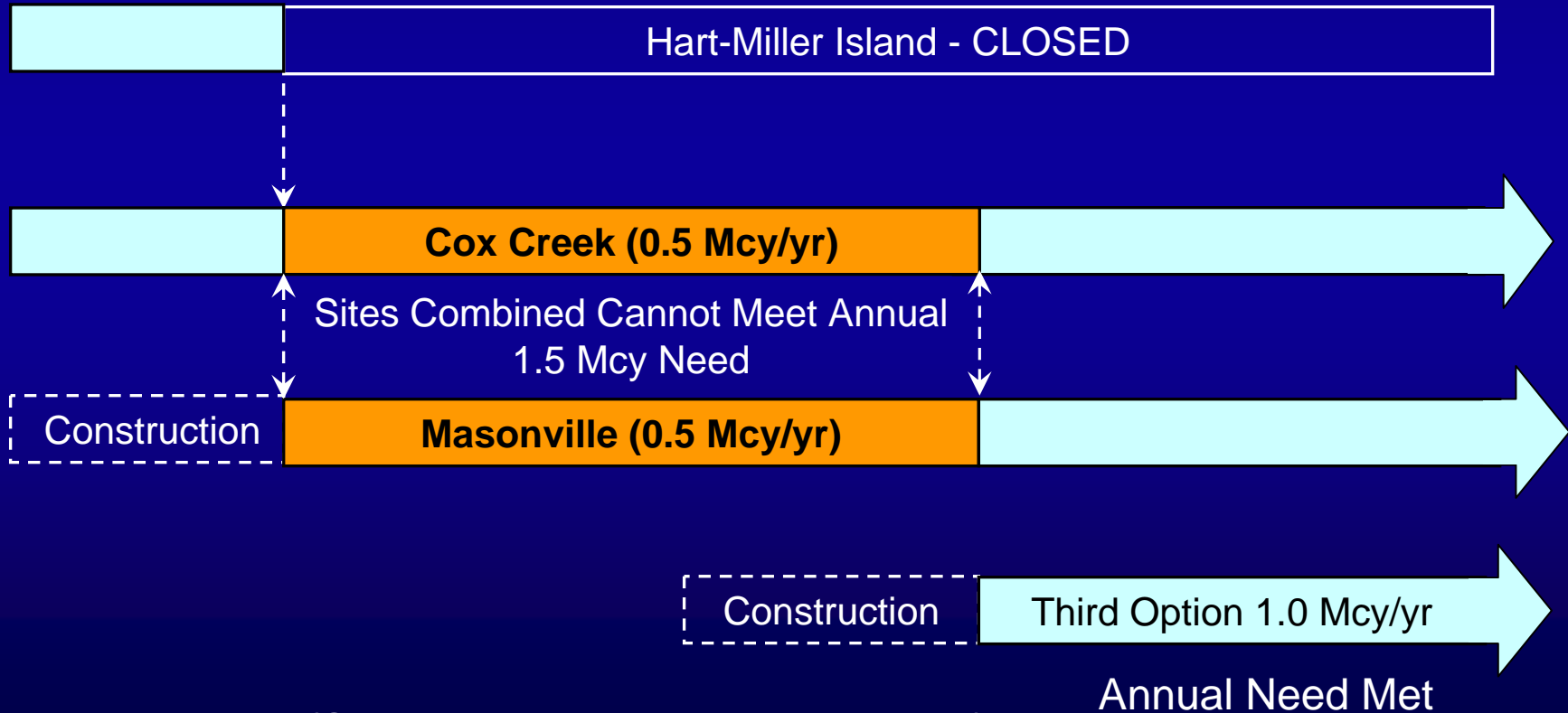
Harbor 20-yr Plan

(Annual 1.5 Mcy Dredging Need)

Calendar Years

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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Annual Need Met



Note: Third option (Sparrows Point, Innovative Reuse)